

THE *SPHEGINA* SPECIES OF EASTERN NORTH AMERICA
(DIPTERA: SYRPHIDÆ)

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The genus *Sphagina* is a small group of syrphid flies that breed in sap wounds of trees. The adults are common pollinators of spring flowers in the northern forests. The nearctic species were studied or revised by Malloch (1922a & b), Cole (1924), and Hull (1935). The immature stages of one nearctic and three palearctic species have been described (see Lavelle and Wallace (1973)). While working separately on revisions of the Syrphidae of Ohio (Coovert) and eastern North America (Thompson), we have discovered much new data on these flies. We present a new arrangement for the nearctic species, description of a new species, four new synonyms, a new key to the eastern species incorporating the previously unknown sexes of five species, and new distributional and biological data. The distributional and biological data have been condensed (only states, or provinces, and counties given); the full data have been placed in the files of the Systematic Entomology Laboratory, ARS, USDA, Washington, D.C.

Stackelberg (1953) described the subgenus *Asiosphagina* for those species of *Sphagina* that lack the first abdominal sternum. While we recognize that this action leaves *Sphagina* proper as a paraphyletic group, we feel *Asiosphagina* is a useful group and accept it as valid. The nearctic species are distributed between these subgenera as follows: *Asiosphagina* (*biannulata* Malloch, *californica* Malloch, *campanulata* Robertson, *petiolata* Coquillett, and *rufiventris* Loew); and *Sphagina* (*appalachiensis* Coovert, *armatipes* Malloch, *brachygaster* Hull, *birdwell* Cole, *cressoni* Hull, *flavimana* Malloch, *flavomaculata* Malloch, *infuscata* Loew (= *pluto* Hull, new synonym), *keeniana* Williston, *lobata* Loew, *lobulifera* Malloch, *melanderi* Cole, *nigrimana* Cole, *notata* Hull, *occidentalis* Malloch, *punctata* Cole, *rufa* Malloch, and *vittata* Cole).

Genus *Sphagina* Meigen

Sphagina Meigen, 1822:193. Type-species, *Milesia clunipes* Fallén (Westwood, 1840:136).

Small, elongate flies (4-8 mm); face strongly concave, bare; cheek linear; eyes bare, dichoptic in both sexes; antenna short, as long as face, with 3rd segment orbicular; arista bare or pubescent. Thorax: anterior mesopleuron, posterior pteropleuron, hypopleuron (including barrette), metasternum all bare; scutellum usually with marginal bristles, without subscutellar fringe; postmetacoxal bridge complete; legs normal except

hind femur enlarged and with ventroapical spinose bristles. Wing: usually hyaline, rarely with crossveins margined with brown; alula narrow or absent, always narrower than width of anal cell; marginal cell open; apical cell closed and petiolate; anterior crossvein basal, at basal $\frac{1}{2}$ or less of discal cell; spurious vein present or absent. Abdomen petiolate.

Sphegina belongs to the subfamily Eristalinae (= Milesiinae), tribe Brachyopini (= Chrysogasterini), subtribe Spheginina (sensu Thompson, 1972:114-115). The genus is separated from all other syrphid flies by the following combination of characters: 1) postmetacoxal bridge is complete and broad; 2) the face is strongly concave; 3) third antennal segment is oval; and 4) the apical crossvein is oblique, forming an acute angle with the third vein. The phylogenetic relationships of *Sphegina* are discussed and diagrammed by Thompson (1972:114-115; 1976); the sister group to *Sphegina* is *Neoascia* Williston.

In the species with an unproduced male 4th sternum or with spinose bristles on the male 3rd and 4th sterna (*brachygaster* Hull, *flavomaculata* Malloch, *appalachiensis* Coovert, *keeniana* Williston), the number of females collected is greater than the number of males. All of the other species show between 1.5 and 3 times as many males collected as females, with *rufiventris* Loew over 6 times. Perhaps different mating behavior could account for this disparity in sex ratio or else inadequate collecting techniques. Further research into the behavior of this genus of closely related flies would be rewarding, especially considering the fact that normally several different species are found flying together.

Key to the subgenera of *Sphegina* Meigen

- | | |
|---|---------------------------------|
| First abdominal sternum present (fig. 16) | <i>Sphegina</i> Meigen |
| First abdominal sternum absent (fig. 15) | <i>Asiosphegina</i> Stackelberg |

Key to the species of *Sphegina* (*Sphegina*) found in eastern North America

- | | |
|--|---------------------------|
| 1. Males | 2 |
| – Females | 8 |
| 2. Fourth sternum laevolobate, asymmetric (figs. 2, 3) | 3 |
| – Fourth sternum not lobate, symmetric (figs. 4, 5, 8, 9, 12) | 4 |
| 3. Third and 4th sterna with short, black spinose bristles apically (fig. 2); humerus pale, yellow to reddish orange; 4th sternum with lobe usually yellow | <i>lobata</i> Loew |
| – Third and 4th sterna with only fine pile (fig. 3); humerus black; 4th sternum with lobe usually brown to black | <i>lobulifera</i> Malloch |
| 4. Third and 4th sterna with short black spinose bristles apically (figs. 4, 9); sternopleuron bare and polished posterodorsally | 5 |

- Third and 4th sterna with only fine pile (figs. 5, 8, 12); sternopleuron completely pollinose 6
- 5. Hind tibia with apicoventral scooplike tooth; front and middle tarsi with apical 2 tarsomeres black; hind tarsus with 2nd and 3rd tarsomeres light yellow and contrasting with other darker tarsomeres *keeniana* Williston
- Hind tibia simple apically (fig. 20); front and middle tarsi with apical 2 tarsomeres yellow, but very slightly darkened; hind tarsus with 2nd and 3rd tarsomeres brown dorsally and nearly concolorous with remaining tarsomeres *appalachiensis* Coovert
- 6. Seventh segment with a distinct tubercle on apicomedial margin (fig. 5); hind tibia with apicoventral scooplike tooth; 4th tergum with apical margin nearly always pallid, yellow to orange; metasternum and ventral $\frac{1}{2}$ of postmetacoxal bridge yellow *flavimana* Malloch
- Seventh segment without a tubercle (figs. 8, 12); hind tibia simple apically or with an acute tooth; 4th tergum with apical margin black; metasternum and postmetacoxal bridge dark 7
- 7. Hind tibia with a small acute apicoventral tooth; vertex with pile shorter than $\frac{1}{2}$ 3rd antennal segment width; hind femur distinctly bicolored, yellow on basal $\frac{1}{3}$, black on apical $\frac{2}{3}$; mesonotum pillinose, with two submedian shiny vittae *flavomaculata* Malloch
- Hind tibia simple apically; vertex with pile longer than $\frac{1}{2}$ 3rd antennal segment width; hind femur not distinctly bicolored, pale on base becoming darker apically, frequently all pale; mesonotum entirely pollinose *brachygaster* Hull
- 8. Sternopleuron bare and polished posterodorsally; hind tarsus with 2nd and 3rd tarsomeres yellow at least ventrally and contrasting with other darker tarsomeres 9
- Sternopleuron completely pollinose; hind tarsus entirely dark, brown 12
- 9. Front extensively shiny, with subtriangular pollinose spots above antennae; 4th tergum entirely orange 10
- Front almost entirely pollinose, with only a narrow medial shiny vitta; 4th tergum widely black apically, yellow to orange basally (humerus pale yellow to orange, contrasting with darker mesonotal disk) 11
- 10. Fourth tergum flared dorsoapically (fig. 19); humerus yellow to orange, contrasting with darker mesonotal disk *lobata* Loew
- Fourth tergum not flared; humerus black, concolorous with mesonotal disk *lobulifera* Malloch
- 11. Hind tibia with apicoventral scooplike tooth; front and middle tarsi with apical 2 tarsomeres black; hind tarsus with 2nd and

- 3rd tarsomeres light yellow and contrasting with other darker tarsomeres
keeniana Williston
- Hind tibia simple apically (fig. 20); front and middle tarsi with apical 2 tarsomeres yellow, but very slightly darkened; hind tarsus with 2nd and 3rd tarsomeres brown dorsally and usually nearly concolorous with 3rd and 4th tarsomeres
appalachiensis Coovert
12. Fifth tergum considerably broader than long, usually with apicolateral clefts, without medial cleft (fig. 17); humerus yellow, contrasting with darker mesonotal disk
flavimana Malloch
- Fifth tergum as long or longer than broad, with a single apico-medial cleft (as in fig. 18); humerus black, concolorous with mesonotal disk 13
13. Abdomen only slightly petiolate, 2nd tergum at narrowest broader than scutellum (fig. 13); vertex with pile longer than $\frac{1}{2}$ 3rd antennal segment width; mesonotum entirely pollinose
brachygaster Hull
- Abdomen strongly petiolate, 2nd tergum at narrowest narrower than scutellum (as in fig. 14); vertex with pile much shorter than $\frac{1}{2}$ 3rd antennal segment width; mesonotum at least partially shiny, shiny areas often appearing as longitudinal vittae
flavomaculata Malloch

Subgenus *Sphegina* Meigen

Sphegina appalachiensis Coovert, new species

Figs. 9, 18, 20, 21, 24, 26, 27

Small black species with or without pale abdominal markings; humerus pale in female; front extensively pollinose; mesonotum with distinct curvilinear depression extending from humerus to transverse suture; male with 4th sternum not lobate, 3rd and 4th sterna with short, black spinose bristles apically; sternopleuron bare and polished posterodorsally; hind tibia simple apically; front and middle tarsi with apical 2 tarsomeres yellow, but very slightly darkened.

Male.—Length: 4.8–6.0 mm. Head: vertex black, sparse silvery gray pollinose, erect short white pilose; front black, densely silvery white pollinose except for narrow medial triangular bare areas above lunule and below ocelli, usually meeting as a thin bare vitta, short erect white pilose laterally, with pile short and less than $\frac{1}{3}$ 3rd antennal segment width; frontal lunule shiny black, lacking pollinose areas; antenna pale orangish yellow except first and second segments slightly darker; arista brownish yellow, darker apically, abruptly thickened on basal $\frac{1}{3}$ to $\frac{1}{4}$, distinctly pubescent, with some of the hairs $\frac{2}{3}$ as long as aristal width; face dull yellow brown, black below antennae, entirely white pollinose, erect white pilose along eye margins; cheek dull yellowish brown, slightly darkened

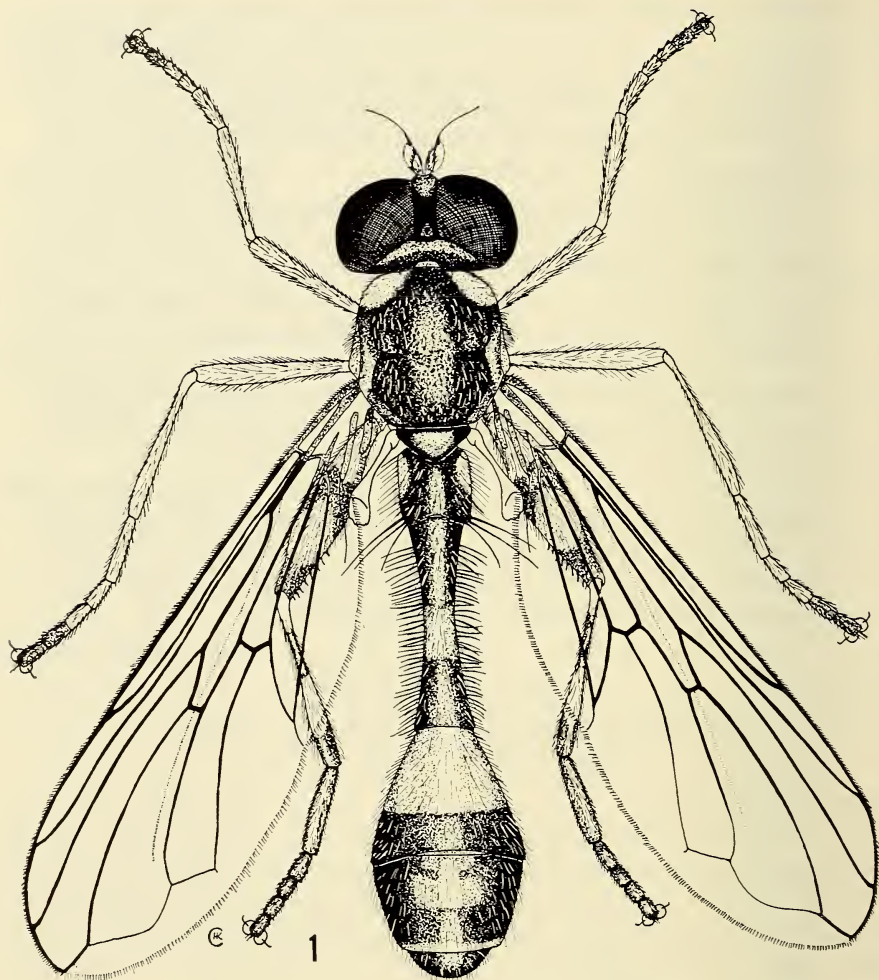
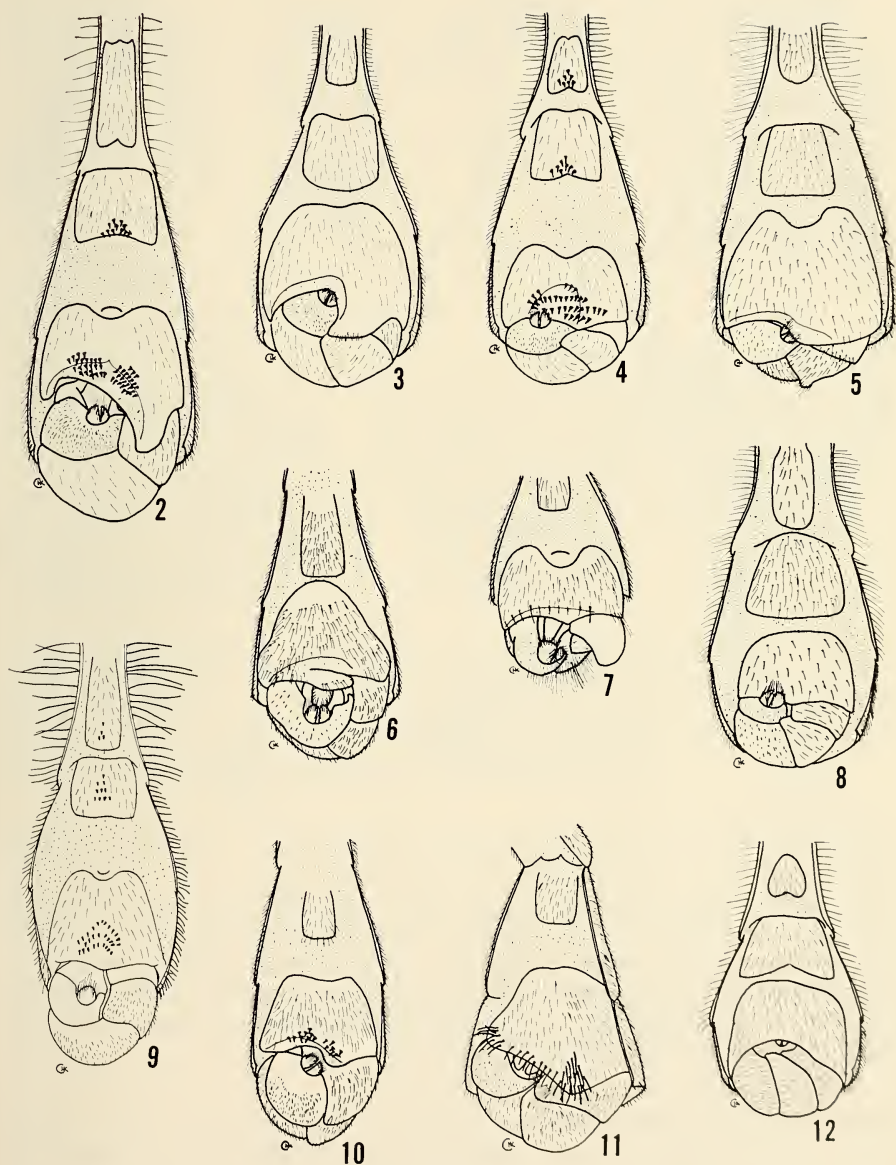


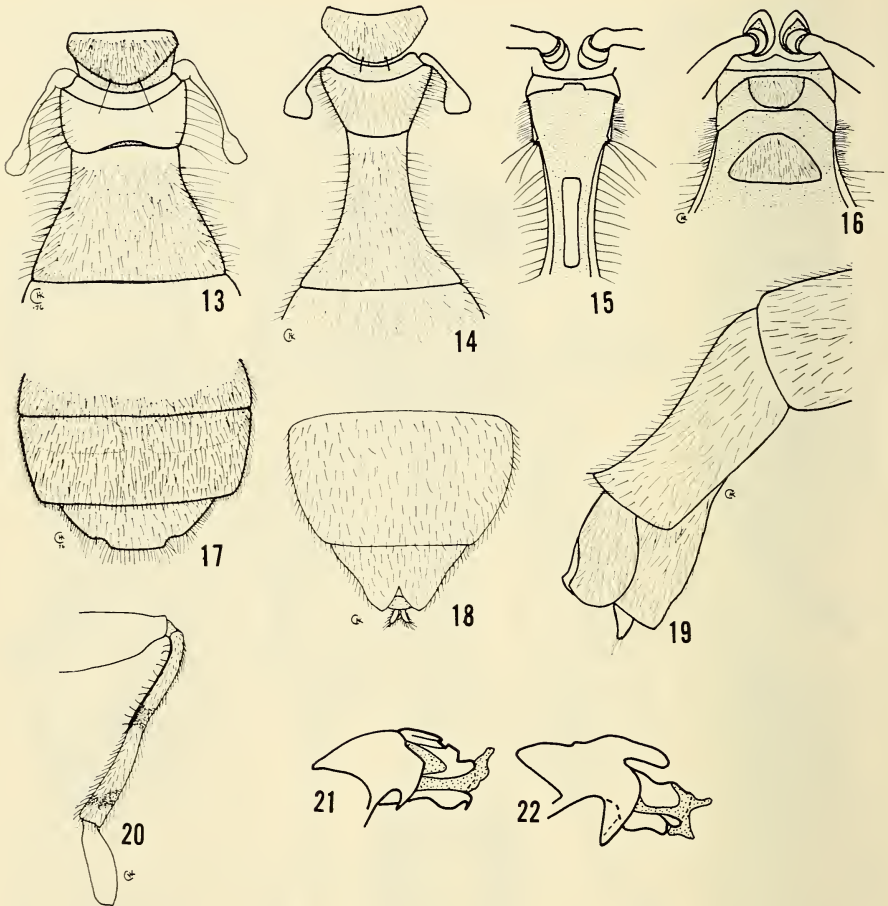
Fig. 1. *Sphegina biannulata* Malloch, habitus, dorsal.

at extreme eye margins, sparsely pollinose; occiput black, silvery gray pollinose, erect white pilose; eye maroon.

Thorax: Entirely shiny except postalarcallus slightly brown tinged in some; dorsum short suberect pilose, silvery white pollinose anteriorly, with distinct curvilinear depression extending from humerus to transverse suture; pleura largely pollinose, bare and shiny on ventral $\frac{1}{3}$ of mesopleuron, on medioventral $\frac{1}{2}$ of pteropleuron and on most of sternopleuron posterodorsally, appressed white pilose only on posterior mesopleuron and anterior pteropleuron; scutellum black, subappressed white

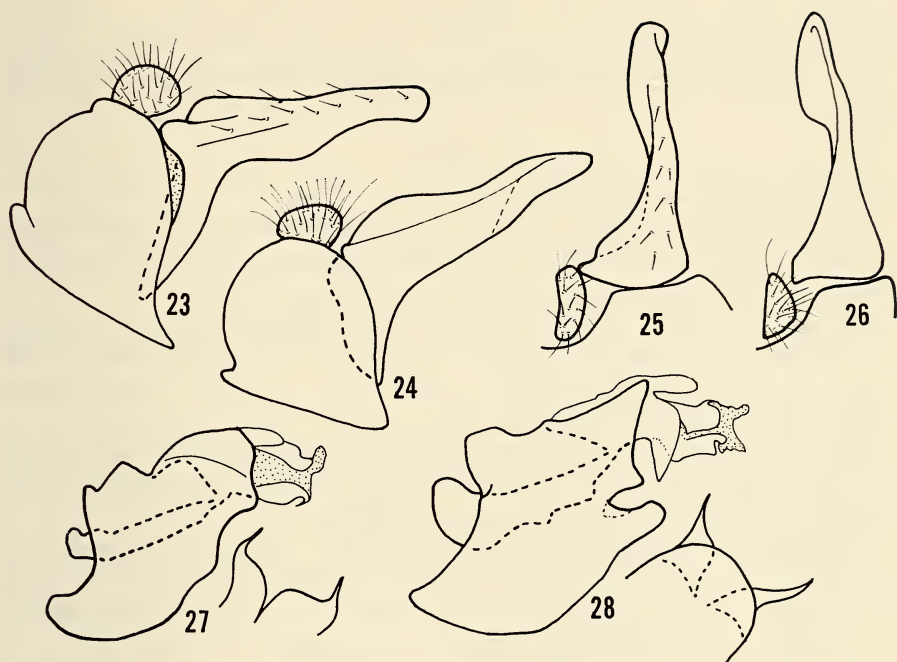


Figs. 2-12. *Sphagina*, male abdomen, ventral: 2, *lobata* Loew; 3, *lobulifera* Malloch; 4, *keeniana* Williston; 5, *flavimana* Malloch; 6, *biannulata* Malloch; 7, *petiolata* Coquillett; 8, *brachygaster* Hull; 9, *appalachiensis* Coovert; 10, *rufiventris* Loew; 11, *campanulata* Robertson; 12, *flavomaculata* Malloch.



Figs. 13-22. *Sphegina*. 13-14, Scutellum and abdominal base, dorsal: 13, *brachygaster* Hull; 14, *lobulifera* Malloch. 15-16, Hind leg and abdominal bases, ventral: 15, *biannulata* Malloch; 16, *brachygaster* Hull. 17-18, female abdominal apex, dorsal: 17, *flavimana* Malloch; 18, *appalachiensis* Coovert. 19, *lobata* Loew, female abdominal apex, lateral. 20, *appalachiensis* Coovert, male hind leg. 21-22, aedeagus, lateral: 21, *appalachiensis* Coovert; 22, *keeniana* Williston.

pilose, apical bristles present or absent. Legs: generally pale straw yellow. Following areas dark brown to black: hind femur on apical $\frac{1}{2}$, except extreme apices, thin ventral edge of hind tibia on basal $\frac{1}{2}$, hind basitarsomere, and apical 2 hind tarsomeres. Following areas brown to dark brown: subapical spot and spot at basal $\frac{1}{3}$ on hind tibia, and 2nd and 3rd tarsomeres of hind tarsus which are slightly paler ventrally and on extreme apices. Apical 2 tarsomeres of front and middle tarsi but



Figs. 23–28. *Sphegina*, male genitalia. 23–24, 9th tergum and associated structures, lateral: 23, *keeniana* Williston; 24, *appalachiensis* Coovert. 25–26, 9th tergum and associated structures, right side, dorsal: 25, *keeniana* Williston; 26, *appalachiensis* Coovert. 27–28, 9th sternum and associated structures, lateral, with a ventral view of ligula area: 27, *appalachiensis* Coovert; 28, *keeniana* Williston.

slightly darkened. Pile appressed and pale. Wing: hyaline, completely microtrichose; subcostal cell yellowish brown beyond costal cell. Halter: pale yellow, brown tinged on extreme base. Squama: white with white fringe.

Abdomen: Shiny black except 3rd tergum with yellow to brownish orange band on basal $\frac{1}{2}$ which is complete, interrupted, or absent; dorsum appressed white pilose except sparsely black apicomediaally on 2nd and 3rd terga; venter shiny dark brown to black except orange vitta sometimes present on 3rd sternum basally and yellow to brown apicomediaally on 4th sternum; venter appressed white pilose, with numerous stubby bristle-like hairs on apicomediaal areas of 2nd, 3rd, and 4th sterna.

Genitalia (figs. 21, 24, 26, 27): Black, white pilose, silvery white polli-nose; cercus small, semicircular; surstyle elongate, slightly angulate apically, with a high dorsomedial carina, bare, (surstyles symmetric); 9th sternum simple, weakly sclerotized ventrad of superior lobe; ligula absent, with lig-ular area narrowly incised medially; superior lobe fused to 9th sternum,

quadrate, bare; aedeagus two segmented, with basal segment symmetric and with small apicolateral recurved spur, with distal segment asymmetric, with a small ventroapical spur on right side; aedeagal apodeme simple, small, rodshaped; ejaculatory apodeme simple, very small, rodshaped.

Female.—Length: 4.8–5.5 mm. Head: similar to that of male except 3rd antennal segment comparatively larger.

Thorax: Similar to male except: humerus and postalar callus always, and area lateral to curvilinear depression usually straw yellow to yellowish brown; black area on hind femur confined to apical $\frac{1}{3}$.

Abdomen: Similar to male except: pale marking present to absent on 3rd and 4th terga; 5th tergum cleft medially; pile on 2nd and 3rd terga extensively black apically; venter shiny black to mostly straw yellow, black spinose hairs absent.

Types.—*Holotype*: ♂, WEST VIRGINIA, Pocahontas Co., Sharp Knob, 18 May 1965, 3,500 ft. (J. G. Chillcott), deposited in Canadian National Collection. *Allotype*: ♀, same data as holotype.

Paratypes: (CNC, DMNH, USNM, BM(NH)): GEORGIA: Fannin Co., Margret, 2 June 1945 (P. W. Fattig) 1 ♀. NORTH CAROLINA: Swain Co., 5 miles north Nantahalalah, 8 June 1965 (J. G. Chillcott) 1 ♂; Mingus Cr., Cherokee-Newfound Gap, 2,000 ft., 4 June 1962 (J. G. Chillcott) 2 ♀ ♀; Macon Co., Wayah Gap, 3,100 ft., 5 June 1965, on *Aruncus* flowers (J. G. Chillcott) 1 ♀; Wilkes Co., Doughton Gap, 2,800 ft., 6 June 1962 (J. G. Chillcott) 1 ♀; Jackson Co., Highlands, Wilson Gap, 3,100 ft., 12 May 1957 (J. R. Vockeroth) 1 ♀; Jackson Co., Highlands, Wilson Gap, 3,100 ft., 25 May 1957 (J. R. Vockeroth) 1 ♀; Graham Co., Kilmer Memorial Forest, 1 June 1975, G. A. C. 448.53 (G. A. Coover) 1 ♀; Graham Co., Kilmer Memorial Forest, 2 June 1975, G. A. C. 449.32 (G. A. Coover) 1 ♀; Haywood Co., 27 June 1961, on *Hydrangea arborescens* (H. V. Weems, Jr.) 2 ♂ ♂, 7 ♀ ♀; Haywood Co., 17–19 June 1955, on *Hydrangea arborescens* (H. V. Weems, Jr.) 3 ♀ ♀; Haywood Co., Sunburst (O. S. Brimley) 1 ♀; Mt. Pisgah, 4–5,000 ft., 20 June 1955 & 4–8 July 1959, on *Hydrangea arborescens* (H. V. Weems, Jr.) 3 ♀ ♀; Dry Falls, 3 miles northwest of Highlands on Highway US 64 on Cullasaja River, 2 July 1964, on *Hydrangea* (H. V. Weems, Jr.) 4 ♀ ♀. TENNESSEE: Sevier Co., Gatlinburg-Newfound Gap, Great Smoky Mountains National Park, 3 June 1962 (J. R. Vockeroth) 2 ♀ ♀; Carter Co., 7 miles SW Shady Valley, 11 June 1965, on *Aruncus* flowers (J. G. Chillcott) 1 ♀. VIRGINIA: Floyd Co., 4 miles east Floyd, Hwy. 860, 2 June 1962, on *Aruncus* blossoms (J. G. Chillcott) 6 ♀ ♀; Patrick Co., Woolwine, 2,500 ft., 2 June 1962, on *Aruncus* blossoms (J. G. Chillcott) 1 ♀; Patrick Co., Vesta, 2,800 ft., 30 May 1962, on *Liriodendron* blossoms (J. G. Chillcott) 1 ♀. WEST VIRGINIA: 7 ♂ ♂, 5 ♀ ♀: same data as Holotype; Pocahontas Co., Cranberry Glades, 7–9 June 1953, on *Acer spicatum* (H.

V. Weems, Jr.) 3♀ ♀; Pocahontas Co., Cranberry Glades, 1-4 June 1955, on *Cornus alternifolia* (H. V. Weems, Jr.) 2♂ ♂, 1♀; Pocahontas Co., Cranberry Glades, 10 July 1967, on *Hydrangea* (H. V. Weems, Jr.) 3♀ ♀.

Discussion

This species is very similar and closely related to *keeniana* Williston with which it has been confused. *Sphegina appalachiensis* differs from *keeniana* Williston by the characters given in the key plus the somewhat smaller male genitalia (v. *keeniana*), slightly smaller black bristlelike hairs on the male abdominal sterna, and absence of a semicircular depressed area on the male fourth sternum (although this area may be weakly sclerotized and pale).

As is common for species of this genus, *appalachiensis* flies in association with other *Sphegina* species, having been found with most of the other eastern species of *Sphegina*. *Sphegina rufiventris* Loew has been most commonly collected with *appalachiensis* which is undoubtedly due to the relative abundance of *rufiventris* Loew. *Appalachiensis* appears to be restricted to the southern portion of the Appalachian Highlands, thus the specific name.

Sphegina brachygaster Hull

Figs. 8, 13, 16

Sphegina brachygaster Hull, 1935:376. Type-locality: NEW YORK, Ithaca. Holotype ♂ CNC.

Sphegina perplexa Hull, 1935:377. Type-locality: QUEBEC, Hull. Holotype AMNH. ♂ New synonymy.

Sphegina brimleyi Shannon, 1940:118. Type-locality: NORTH CAROLINA, Highlands, 5,000 ft. Holotype ♂ USNM. New synonymy.

Distribution.—Fifty-two males and 68 females examined. USA: Maine (Piscataquis), Massachusetts (Berkshire, Franklin, Hampden), New Hampshire (Coos, Grafton), New York (Tompkins), North Carolina (Macon, Jackson, Swain, Wilkes), Ohio (Hocking), Tennessee (Sevier), Vermont (Essex), Virginia (Giles). CANADA: Manitoba, Nova Scotia, Ontario (Simcoe), Quebec (Gatineau, Sherbrooke-Shefford).

Flight period.—Earliest record 27 April (Ohio), latest record 12 July (Quebec), with most of the records in May and June.

Flower records.—*Daucus carota* L., *Lindera benzoin* (L.) Blume.

Variation.—Significant variation in facial color and width was noted in a long series (43♂ ♂, 32♀ ♀) collected by H. V. Weems, Jr., near Cashiers, Jackson County, North Carolina. Six males had entirely dark and broad ($\frac{1}{2}$ of head width) faces in contrast to the normal partially yellow and narrow ($\frac{1}{3}$ in males, $\frac{3}{10}$ in females, of head width) faces. While a few (5)

females also had entirely dark and broad (% of head width) faces there were some females (3) intermediate in terms of these characteristics.

Comments.—We have examined the holotypes of *brachygaster* Hull, *perplexa* Hull and *brimleyi* Shannon and have found them to be representatives of the same species. We here select *brachygaster* Hull as senior to *perplexa* Hull as that name is the most appropriate descriptor for the species.

Sphegina flavimana Malloch

Figs. 5, 17

Sphegina flavimana Malloch, 1922a:143. Type-locality: Maryland, near Plummers Island. Holotype ♂ USNM (lost).

Distribution.—Ninety-six males and 65 females examined. USA: District of Columbia, Georgia (Habersham, Rabun), Indiana (Tippecanoe), Iowa (Story), Maryland (Montgomery, Prince Georges), Massachusetts (Barnstable, Berkshire, Hampshire, Suffolk), Michigan (Alger), New Hampshire (Carroll, Coos, Grafton), New Jersey (Burlington), New York (Essex, Orange, Rensselaer, Rockland, Tompkins, Suffolk, Warren), North Carolina (Macon, McDowell), Ohio (Adams, Ashland, Champaign, Clark, Gallia, Highland, Hocking, Lucas, Medina, Montgomery, Ross, Warren), Pennsylvania (Dauphin, Philadelphia), Tennessee (Sevier), Vermont (Bennington), Virginia (Fairfax, Falls Church, Floyd, Patrick), West Virginia (Ritchie, Taylor). CANADA: Manitoba, New Brunswick, Nova Scotia, Ontario (Hastings, Ottawa-Clareton, Simcoe, Thunder Bay), Quebec (Brome, Gatineau, Hull, Kamouraska).

Flight period.—Earliest record 2 May (Ontario), latest record 11 Sept. (North Carolina), with most of the records equally distributed between the months of May, June and July.

Flower records.—*Aruncus dioicus* (Walt.) Fern., *Ceanothus* sp., *Chrysanthemum* sp., *Cicuta maculata* L., *Conium maculatum* L., *Cryptotaenia canadensis* (L.) DC., *Hydrangea arborescens* L., *Lysimachia ciliata* L.

Sphegina flavomaculata Malloch

Fig. 12

Sphegina flavomaculata Malloch, 1922a:141. Type-locality: VIRGINIA, Great Falls. Holotype ♂ USNM (lost).

Distribution.—Thirty males and 31 females examined. USA: Maryland (Montgomery), Massachusetts (Franklin, Hampden), New Hampshire (Grafton), New York (Orange, Tompkins), North Carolina (Graham, Macon), Ohio (Hocking, Jefferson, Pike), Pennsylvania (Philadelphia), Virginia (Fairfax). CANADA: Quebec (Brome, Gatineau, Vercheres).

Flight period.—Earliest record 27 March (Virginia), latest record 6 July (New Hampshire), with most of the records in May.

Flower records.—*Caulophyllum thalictoroides* (L.) Michx., *Dentaria laciniata* Muhl., *Prunus pennsylvanica* L., *Rubus* sp., *Tiarella cordifolia* L.

Comments.—The characteristic apicoventral tooth on the male hind tibia, which helps to distinguish that sex, is lacking in the female.

Sphegina keeniana Williston

Figs. 4, 22, 23, 25, 28

Sphegina keeniana Williston, 1887:113, pl. 4, fig. 11 (wing). Type-locality: PENNSYLVANIA, Philadelphia, Fairmont Park. Syntypes 3♂ 4♀ (USNM, ANSP).

Distribution.—Ninety-three males and 118 females examined. USA: Connecticut (Fairfield, New London), Georgia (Clarke, Fannin), Indiana (Tippecanoe), Kentucky (Harlan), Maine (Hancock), Maryland (Montgomery, Prince Georges), Massachusetts (Berkshire, Dukes, Hampshire), New Hampshire (Coos, Grafton, Sullivan), New Jersey (Bergen, Burlington), New York (Bronx, Essex, Suffolk, Tompkins), North Carolina (Macon), Ohio (Champaign, Clark, Hamilton, Highland, Hocking, Medway, Montgomery, Pike, Ross, Summit, Vinton, Warren), Pennsylvania (Allegheny, Philadelphia, Susquehanna, Westmoreland), South Carolina (Pickens), Tennessee (Anderson), Vermont (Rutland), Virginia (Fairfax, Falls Church, Floyd, Giles, Page), West Virginia (Taylor). CANADA: Nova Scotia Ontario (Norfolk, Ottawa-Carleton, Simcoe, Wentworth, York), Quebec (Gatineau, Kamouraska).

Flight period.—Earliest record 9 March (Indiana), latest record 1–15 Aug. (Vermont), with most of the records in May and June.

Flower records.—*Aruncus dioicus* (Walt.) Fern., *Camassia scilloides* (Raf.) Cory, *Cicuta maculata* L., *Conium maculatum* L., *Cryptotaenia canadensis* (L.) DC., *Daucus carota* L., *Galax aphylla* L., *Geranium* sp., *Heracleum maximum* Bartr., *Hydrangea arborescens* L., *Rubus* sp., *Sanicula marilandica* L.

Comments.—This species can only be confused with *appalachiensis* from which it can be separated by the apicoventral scooplike tooth on the hind tibia and the structure of the male genitalia. This tooth, unlike that of *flavomaculata* Malloch, is present in both sexes, but is more prominent in the male. The male genitalia of *keeniana* differ from those of *appalachiensis* as follows: 1) surstyle is bare, with a smaller and lower dorso-medial carina, and with apex not as strongly angulate; 2) superior lobe is triangular, not quadrate; 3) ligula is broad, and convex apically, not absent; 4) aedeagal apodeme is enlarged anteriorly; 5) basal segment of aedeagus

has a dorsomedial projection as well as a larger apicolateral spur; and 6) distal segment of aedeagus lacks an apicolateral spur.

Sphegina lobata Loew

Figs. 2, 19

Sphegina lobata Loew, 1863:12. Type-locality: "Mittelstaaten." Syntypes 1♂ 1♀ MCZ.

Sphegina monticola Malloch, 1922a:142. Type-locality: NEW HAMPSHIRE, Mount Washington. Holotype ♀ USNM. New synonymy.

Distribution.—Sixty-eight males and 28 females examined. USA: Maine (Penobscot, Piscataquis), Michigan (Alger), New Hampshire (Coos, Grafton), New York (Essex), North Carolina (Avery, Graham, Haywood, Macon, Swain), Ohio (Pike), Tennessee (Sevier), Vermont (Bennington, Essex), Virginia (Smyth). CANADA: Ontario (Simcoe, Wellington), Quebec (Brome, Gatineau, Hull, Temiscamingue).

Flight period.—Earliest record 16 May (Quebec), latest record 6 Aug. (Quebec), with most of the records in June and July.

Flower records.—*Aralia nudicaulis* L., *Chrysanthemum* sp., *Clintonia borealis* (Ait.) Faf., *Cryptotaenia canadensis* (L.) DC., *Daucus carota* L., *Hydrangea arborescens* L., *Osmorhiza* sp., *Rubus* sp., *Viburnum recognitum* Fern.

Comments.—The holotype of *monticola* Malloch has been examined and found to be a female of *lobata* Loew, a form unknown to Malloch.

Sphegina lobulifera Malloch

Figs. 3, 14

Sphegina lobulifera Malloch, 1922b:269. Type-locality: MARYLAND, Plummers Island. Holotype ♂ USNM (lost).

Distribution.—Fifteen males and 5 females examined. USA: Connecticut (Fairfield, Litchfield), Maryland (Montgomery, Prince Georges), Massachusetts (Bristol), Mississippi (Lafayette), New Hampshire (Grafton, Coos), North Carolina (Avery, Macon), Ohio (Jefferson), Gaspe, Vermont (Essex), Virginia (Fairfax, Giles). CANADA: Quebec (Gaspé, Kamouraska, Quebec).

Flight period.—Earliest record 1–15 Apr. (Mississippi), latest record 10 July (Quebec), with most of the records in June.

Flower records.—*Aruncus dioicus* (Walt.) Fern., *Caulophyllum thalictroides* (L.) Michx., *Heracleum maximum* Bartr., *Rubus* sp.

Comments.—As evidenced by the numbers of specimens collected, this is the least common eastern species.

Key to the species of *Sphegina* (*Asiosphegina*)
found in Eastern North America

1. Mesonotum entirely shiny on disk; front shiny on dorsal $\frac{1}{2}$; arista pubescent, with hairs longer than aristal width; male 4th sternum with weakly sclerotized pallid lobe apicolaterally and discontinuous with sternum (figs. 6, 7) 2
- Mesonotum with 2 broad medial pollinose vittae; front pollinose at least laterally on dorsal half; arista nearly bare, hairs much shorter than aristal width; male 4th sternum produced triangularly on left side, with lobe continuous and concolorous (figs. 10, 11) 3
2. Scutellum with a pair of long apical bristles; front and middle tarsi with apical 2 tarsomeres black; male 4th sternum with large apicolateral lobe on left side (fig. 7) *petiolata* Coquillett
- Scutellum without bristles; front and middle tarsi with apical 2 tarsomeres yellow to slightly brownish; male 4th sternum with a narrow submedial shelflike lobe (fig. 6) *biannulata* Malloch
3. Third antennal segment partially to entirely orange; wing completely microtrichose; male 4th sternum without black spinose bristles, asymmetric, produced apicolaterally on left side (fig. 11) *campanulata* Robertson
- Third antennal segment dark brown to black; wing partially bare basally, 2nd basal cell bare on anterobasal $\frac{2}{3}$; male 4th sternum usually with short black spinose bristles medially, not strongly asymmetric (fig. 10) *rufiventris* Loew

Subgenus *Asiosphegina* Stackelberg

Sphegina, subgenus *Asiosphegina* Stackelberg, 1974:446 (1953:376). Type-species, *Sphegina sibirica* Stackelberg (Stackelberg, 1974:446) NB: The name *Asiosphegina* is available from 1974 when Stackelberg designated a type-species, not 1953 when he described the subgenus.

Sphegina biannulata Malloch

Figs. 1, 6, 15

Sphegina biannulata Malloch, 1922a:143. Type-locality: VIRGINIA, near Plummers Island. Holotype ♀ USNM (lost).

Distribution.—Twenty-seven males and 14 females examined. USA: Georgia (Rabun), North Carolina (Graham, Jackson, Macon), Pennsylvania (Philadelphia), Tennessee (Sevier), Virginia (Fairfax).

Flight period.—Earliest record 18 May (Tennessee), latest record 10 Aug. (North Carolina), with most of the records in May and June.

Flower records.—*Galax aphylla* L.

Sphegina campanulata Robertson

Fig. 11

Sphegina campanulata Robertson, 1901:284. Type-locality: ILLINOIS, Carlinville. Syntypes 2♂ INHS.

Distribution.—Seventy-four males and 31 females examined. USA: Connecticut (Hartford), Illinois (Macoupin), Indiana (Tippecanoe), Iowa (Story), Maine (Franklin, Piscataquis), Maryland (Montgomery, Prince Georges), Missouri (Jackson), New Hampshire (Cheshire, Sullivan), New York (Greene), North Carolina (Graham, Jackson, Macon, Swain), Ohio (Athens, Clark, Greene, Hamilton, Hocking, Montgomery, Pike, Scioto, Warren), Pennsylvania (Allegheny, Philadelphia), Tennessee (Sevier), Vermont (Bennington), Virginia (Fairfax, Floyd, Giles), West Virginia (Ritchie, Taylor). CANADA: Ontario (Essex, Ottawa-Carleton, Simcoe), Quebec (Gatineau).

Flight period.—Earliest record 3 May (Indiana), latest record 1 Aug. (Virginia), with most of the records from mid-May to mid-July.

Flower records.—*Aruncus dioicus* (Walt.) Fern., *Cryptotaenia canadensis* (L.) DC., *Hydrangea arborescens* L., *Hydrophyllum* sp., *Osmorhiza* sp., *Rubus* sp., *Sambucus* sp., *Viburnum recognitum* Fern.

Sphegina petiolata Coquillett

Fig. 7

Sphegina petiolata Coquillett, 1910:125. Type-locality: NEW HAMPSHIRE, White Mountains. Holotype ♂ USNM.

Distribution.—Forty-six males and 23 females examined. USA: Maine (Hancock), Maryland (Prince Georges), Massachusetts (Hampshire, Worcester), New Hampshire (Coos, Grafton), New Jersey (Bergen), New York (Essex, Tompkins), North Carolina (Macon), Ohio (Ashland, Champaign), West Virginia (Pocahontas), Wisconsin (Douglas). CANADA: Manitoba, New Brunswick, Ontario (Norfolk, Oxford, Simcoe, Sudbury), Quebec (Gatineau, Joliette, Kamouraska, Papineau, Terrebonne).

Flight period.—Earliest record 18 May (W. Virginia), latest record 27 August (Maine), with most of the records from June to mid-August.

Flower records.—*Blephilia* sp., *Chrysanthemum leucanthemum* L., *Cryptotaenia canadensis* (L.) DC., *Sanicula marilandica* L., *Veratrum* sp.

Sphegina rufiventris Loew

Fig. 10

Sphegina rufiventris Loew, 1863:13. Type-locality: NEW YORK. Syntypes MCZ.

Distribution.—Five hundred eight males and 77 females examined. USA: Connecticut (Fairfield), District of Columbia, Georgia (Rabun), Illinois

(Carroll), Kentucky (Harlan), Maine (Franklin, Oxford, Penobscot, Piscataquis, Washington), Maryland (Frederick, Montgomery), Massachusetts (Middlesex, Worcester), New Hampshire (Carroll, Cheshire, Coos, Grafton), New Jersey (Burlington, Passaic, Sussex), New York (Essex, Orange, Tompkins), North Carolina (Avery, Graham, Haywood, Jackson, Macon, Swain, Wilkes, Yancey), Ohio (Champaign, Clark, Franklin, Gallia, Highland, Hocking, Montgomery, Pike), Pennsylvania (Allegheny, Carbon/Lehigh, Lycoming, Philadelphia, Westmoreland), Tennessee (Anderson, Campbell, Sevier), Vermont (Essex, Orleans, Rutland), Virginia (Arlington, Augusta, Buchanan, Fairfax, Falls Church, Giles, Page, Patrick, Rockbridge, Smyth, Sussex), West Virginia (Monongalia, Pendleton, Ritchie, Taylor). CANADA: New Brunswick, Newfoundland, Ontario (Northumberland, Ottawa-Carleton, Simcoe), Quebec (Gaspé-est & ouest, Gatineau, Joliette, Kamouraska, Lac-St. Jean-Ouest, Mégantic, Saguenay, Sherbrooke-Shefford, Vercheres).

Flight period.—Earliest record 27 April (Maryland), latest record 13 Aug. (Quebec), with most of the records in June and July.

Flower records.—*Aralia nudicaulis* L., *Aruncus dioicus* (Walt.) Fern., *Castanea pumila* (L.) Mill., *Ceanothus* sp., *Clintonia borealis* (Ait.) Raf., *Conium maculatum* L., *Cornus canadensis* L., *C. stolonifera* Michx., *Cryptotaenia canadensis* (L.) DC., *Daucus carota* L., *Heracleum* sp., *Hydrangea arborescens* L., *Prunus virginiana* L., *Rubus* sp., *Saxifraga micranthidifolia* (Haw.) Britt., *Spiraea tomentosa* L., *Viburnum recognitum* Fern., *Viburnum* sp., *Washingtonia* sp.

Comments.—This is by far our most common species, being found more commonly in the summer months. The number of males collected outnumber the females by over 6 times, being a much higher ratio than any other Eastern *Sphegina*.

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